Department of Mathematics
Mat 322: Analysis in Several Dimensions
Spring 2003

Course instructor: Santiago R. Simanca (santiago@math.sunysb.edu). Phone: 2-7308. Office: Math Tower 5D-148. Office hours: MWF 11:00-1:00, or by appointment.

Classroom: Chemistry Building 126. Time: TTh 2:20-3:40.

Text: *Vector Calculus, Linear Algebra, and Differential Forms*, 2nd edition, by J. H. Hubbard & B. B. Hubbard, Prentice Hall.

Description: This course is a rigorous introduction to Calculus in several variables. We will analyze techniques to study functions whose domains are subsets of R^n, essential tools in the pursue of advanced level mathematics, or any science in general. We shall begin with the geometric description of R^n, and discuss matrices as linear transformations. We will develop criteria for differentiability of functions, solve basic linear equations, relate the dimensions of kernel and images of linear transformations, and discuss the inverse and implicit function theorem, the *most general and fundamental result* in the proof of existence of solutions to (suitable) non-linear equations. Then, we will proceed with the definition and study of higher order derivatives of functions, quadratic forms, integration, and submanifolds of R^n, the latter subject emphasizing the case of curves and surfaces. The course will end with a description of forms and the exterior differentiation operator, the statement of Stokes' Theorem and some of its applications.

Homework: There will be four assignments throughout the semester, that you will receive at least two weeks in advance. Their due dates are stated in the detailed syllabus below. *No late homework will be accepted.*

Examinations: There will be two midterms and a final examination, as indicated below:

Test	Date	Time
Midterm 1	March 4	02:20-03:40
Midterm 2	April 8	02:20-03:40
Final	May 20	02:00-04:30

Grading: The homework assignments, each midterm, and the final examination will count for 20%, 25%, and 30% of your final grade, respectively.

Schedule: The following is the basic syllabus. If necessary, adjustments will be made as the semester progresses. Please read the relevant parts of the book **before** each class. You should try to solve all exercises in each section of the book that we cover; the recommended ones represent the least you should do.

Week of	Sections Covered	Recommended exercises
Jan. 20	1.3	4, 7, 11, 15, 16, 22
Jan. 27	1.4, 1.5	7, 10, 16, 23, 25; 1, 2, 7, 12, 14, 21, 23
Feb. 3	1.6, 1.7	2, 3, 6, 7, 10, 11; 2, 4, 12, 13, 15, 22
Feb. 10	1.8, 1.9, 2.1	2, 7, 10; 1, 2, 3; 1, 7, 10
Feb. 17	2.2, 2.3, 2.4	2, 7, 10, 11; 2, 7, 13; 4, 7, 11, 13; First homework due
Feb. 24	2.5, 2.6, 2.7	1, 5, 8, 15, 17; 1, 7, 8; 1, 2, 3, 12, 13
Mar. 3	Midterm 1, 2.9	1, 4, 5, 11, 17
Mar. 10	3.1, 3.2, 3.3	2, 5, 8, 10, 12, 22; 1, 5; 1, 6, 9, 13; Second homework due
Mar. 17	Spring recess	
Mar. 24	3.5, 3.6, 3.7	1, 3, 7, 12; 1, 2, 8; 1, 2, 5, 11
Mar. 31	3.8, 4.1	1, 4, 10; 1, 5, 6, 8, 9, 10; Third homework due
Apr. 7	Midterm 2, 4.2, 4.3	1, 3, 4; 1, 2, 4
Apr. 14	4.5, 4.8 Easter week	7, 8, 11, 12, 13; 1, 5, 8, 15
Apr. 21	4.9, 4.10	1, 3, 4; 1, 4, 9, 12, 17
Apr. 28	5.1, 5.2, 5.3	1, 3, 4; 2, 3; 1, 6, 7, 8
May 5	6.8, 6.10	1, 2, 6; 1, 2, 3, 4; Fourth homework due
May 20	Final Exam	2:00-4:30

If you have a physical, psychological, medical or learning disability that my impact on your ability to carry out assigned course work, please contact the staff in the Disabled Student Service Office, Room 133, Humanities, 632-6784/TDD. DSS will review your concerns and determine with you what accommodations are necessary and appropriate. All information and documentation of disability is confidential.

The State University of New York at Stony Brook is an affirmative action/equal employment opportunity educator and employer.